PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
010374WO		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US02/34805	29 October 2002 (29.10.2002)	29 October 2001 (29.10.2001)

International Patent Classification (IPC) or national classification and IPC

IPC(7): H04L 27/06 and US Cl.: 375/142-143,148-150,152,340,343,346,349; 370/335,342,350

Applicant

QUALCOMM INCORPORATED

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 12 sheets, including this cover sheet.

   ☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of ___ sheets.

3. This report contains indications relating to the following items:

   I ☒ Basis of the report

   II ☐ Priority

   III ☐ Non-establishment of report with regard to novelty, inventive step and industrial applicability

   IV ☐ Lack of unity of invention

   V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

   VI ☐ Certain documents cited

   VII ☐ Certain defects in the international application

   VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
29 May 2003 (29.05.2003)	12 October 2005 (12.10.2005)
Name and mailing address of the IPEA/US Mail Stop PCT, Attn: IPEA/ US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (703) 305-3230	Authorized officer Khanh Tran Telephone No. 571-272-3007

Form PCT/IPEA/409 (cover sheet)(July 1998)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/US02/34805

I. Basis of the report

1. With regard to the elements of the international application:*

☒ the international application as originally filed.

☒ the description:
pages 1-23 as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.

☒ the claims:
pages 24-30, as originally filed
pages NONE, as amended (together with any statement) under Article 19
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.

☒ the drawings:
pages 1-13, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.

☐ the sequence listing part of the description:
pages NONE, as originally filed
pages NONE, filed with the demand
pages NONE, filed with the letter of _____.

2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination(under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in printed form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages NONE

☐ the claims, Nos. NONE

☐ the drawings, sheets/~~fig~~ NONE

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

** Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*
*** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. STATEMENT

Novelty (N)	Claims Please See Continuation Sheet	YES
	Claims Please See Continuation Sheet	NO
Inventive Step (IS)	Claims Please See Continuation Sheet	YES
	Claims Please See Continuation Sheet	NO
Industrial Applicability (IA)	Claims Please See Continuation Sheet	YES
	Claims Please See Continuation Sheet	NO

2. CITATIONS AND EXPLANATIONS
Please See Continuation Sheet

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

V.1. Reasoned Statements:
The opinion as to Novelty was positive (Yes)with respect to claims 1-39
The opinion as to Novelty was negative (No) with respect to claims NONE
The opinion as to Inventive Step was positive (Yes)with respect to claims 3, 11, 14, 19, 22, 28 and 31
The opinion as to Inventive Step was negative(NO) with respect to claims 1-2, 4-10, 12-13, 15-18, 20-21, 23-27, 29-30 and 32-39
The opinion as to Industrial Applicability was positive (YES) with respect to claims 1-39
The opinion as to Industrial Applicability was negative(NO) with respect to claims NONE

V. 2. Citations and Explanations:

1. Claims 1-2, 4-10, 12, 16-18, 20, 24-27, 29, 33-39 lack an inventive step under PCT Article 33(3) as being obvious over Watanabe U.S. Patent 6,044,104.

Regarding claim 1, in column 3, line 39 via column 4, line 31, figure 1 illustrates a mobile station apparatus according to embodiment 1 of Watanabe invention.
- when a signal transmitted from a base station apparatus is received, the received signal is input to reception RF section 1 and converted to a baseband signal. AD conversion section 2 converts this baseband signal from analog to digital. The digital signal is input to the 1st to Nth correlators and demodulation correlator 4. Watanabe does not expressly disclose a correlation logic as set forth in the claim. Watanabe teaches that the 1st to Nth search correlators 3 operate on the operating clock input from clock generator 9 and detect a correlative value of the pilot channel at a phase indicated from search control section 8. In view of the foregoing, it would have been obvious for one of ordinary skill in the art at the time the invention was made that detecting a correlative value of the pilot channel would be equivalent to the claimed "*determining a correlation function representing the correlation between a signal and one or more shifted versions of an identification code*". The correlative value is representative of the correlation function. Watanabe further teaches that the 1st to Nth search correlators 3 find correlative values in a short integrating time for all phases within the divided windows. Because the correlators 3 use a short integrating time to shorten a search time, they do not suppress interference or noise sufficiently. Therefore, the search control section 8 rearranges the correlative values, selects multiple phases in descending order of detected correlative values, makes each correlator carry out correlative detection about these selected phases simultaneously in an integrating time longer than the 1st integrating time. In view of that, the 1st to Nth search correlators 3 performs correlation function using a dynamically variable integration time.
- Watanabe does not expressly disclose analysis logic for analyzing the correlation function estimating, responsive thereto, one or more parameters relating to the signal as claimed. As recited above, the search control section 8 rearranges the correlative values, selects multiple phases in descending order of detected correlative values. In column 4, lines 31-40, search control section 8 further rearranges the correlative values obtained in the order of electric power and selects correlative values by the number of demodulable phases from the top and combines these selected correlative values to obtain the strength of the pilot channel of the base station apparatus. In light of the foregoing discussion, the search control section 8 performs the function of the analysis logic specified in the claim, therefore, one of ordinary skill in the art would have recognized the interchangeability of the search control section 8 shown in Watanabe invention for the corresponding analysis logic specified in the claim.

Regarding claim 2, in column 4, lines 7-17, when search control section 8 tries to measure the strength of the pilot channel of a base station apparatus using the search phase and search window width of a peripheral base station apparatus received from a base station apparatus with which it is communicating, it divides the search window into N portions and assigns these divided windows to the 1st to Nth search correlators 3, which find correlative values in a short integrating time for all phases within the divided windows. In light of that, the foregoing teachings address the claimed limitations "*configured to first attempt to estimate the one or more parameters from a correlation function derived using a first integration time*". Then, the search control section 8 rearranges the correlative values, selects multiple phases in descending order of detected correlative values, makes each correlator carry out correlative detection about these

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

selected phases simultaneously in an integrating time longer than the 1st integrating time. In light of that, the foregoing teachings address the claimed limitations "*if successful, estimate the one or more parameters from a correlation function derived using a second integration time which may differ from the first*".

Regarding claim 4, as recited in claim 1, search control section 8 rearranges the correlative values, selects multiple phases in descending order of detected correlative values, makes each correlator carry out correlative detection about these selected phases simultaneously in *an integrating time longer than the 1st integrating time*.

Regarding claim 5, Watanabe does not teach the analysis of correlation function derived from the signal using a default integration time as claimed. As recited in claim 2, when search control section 8 tries to measure the strength of the pilot channel of a base station apparatus using the search phase and search window width of a peripheral base station apparatus received from a base station apparatus with which it is communicating, it divides the search window into N portions and assigns these divided windows to the 1st to Nth search correlators 3, which find correlative values in a short integrating time for all phases within the divided windows. Because all search correlators 3 are initially employed, it would have been obvious for one of ordinary skill in the art at the time the invention was made that the first integration time is the default integration time and the second integration time is determined from the analysis of correlative values obtained from the first integration time.

Regarding claim 6, as discussed in column 1 line 45 via column 2 line 10, all base station apparatuses transmit a pilot channel which is spread with the same long code. All base station apparatuses use one long code, which is assigned different long code phases to different base station apparatuses. Watanabe teachings divides the search window into N portions and assigns these divided windows to the 1st to Nth search correlators 3. The 1st to Nth search correlators 3 find correlative values in a short integrating time for all phases within the the divided windows and outputs these correlative values. The correlative values, representative for all phases, are rearranged in the order of electric power starting with the one with the maximum power and assigns the selected phases equally to the 1st to Nth search correlators 3. The 1st to Nth search correlators 3 detect correlative values in a second integrating time long enough to obtain the accuracy to carry out cell judgment on the specified phases. In light of the foregoing discussion, Watanabe teachings encompass the claimed limitations; see column 4, lines 5-31.

Regarding claim 7, claim lacks an inventive step on the same ground as for claim 1 because of similar scope.

Regarding claim 8, claim lacks an inventive step on the same ground as for claim 6 because of similar scope. Furthermore, after the second phase, search control section 8 further rearranges the correlative values obtained in the order of electrical power and selects correlative values by the number of demodulable phases from the top and combines these selected correlative values to obtain the strength of the pilot channel of this base station apparatus.

Regarding claims 9-10, 17-18 and 26-27, as recited in claim 6, all base station apparatuses transmit a pilot channel which is spread with the same long code. All base station apparatuses use one long code, which is assigned different long code phases to different base station apparatuses.

Regarding claims 12, 20 and 29, claims lack an inventive step on the same ground as for claim 4 because of similar scope.

Regarding claims 16 and 35, claims lack an inventive step on the same ground as for claim 8 because of similar scope. Furthermore, in column 4, lines 15-35, the correlative values using a short integrating time within the entire search window are obtained. Since the outputs of the correlators 3 use a short integrating time to shorten a search time, they do not suppress interference or noise sufficiently nor achieve the accuracy to carry out cell judgment. In view of that, the foregoing teachings correspond to the claimed "attempting to estimate, responsive to the first correlation function, one or more parameters relating to the signal; and if the attempt is unsuccessful ... ".

Regarding claims 24 and 33, in column 4, lines 40-45, Watanabe teaches that the operation is repeated by the number of base stations notified to measure the strength of the pilot channels of all peripheral base station apparatuses received from the base station apparatus with which it is communicating.

Regarding claims 25, 34 and 36, claims lack an inventive step on the same ground as for claim 8 because of similar scope.

Regarding claim 37, Watanabe does not teach to implement the cell search method as claimed in the pending application. Nevertheless, a person of average skill in the art of computer programming would have recognized that the cell search method can be implemented as a series of instructions stored in a processor readable medium.

Regarding claim 38, Watanabe does not teach to implement the cell search method as claimed in the pending application. Nevertheless, a person of average skill in the art of computer programming would have recognized that the cell search method can be implemented as a series of instructions stored on a server.

Regarding claim 39, Watanabe does not teach to implement the cell search method as claimed in the pending application. Nevertheless, a

Supplemental Box
(To be used when the space in any of the preceding boxes is not sufficient)

person of average skill in the art of computer programming would have recognized that the cell search method can be implemented as a synthesized logic.

2. Claims 13, 15, 21, 23, 30 and 32 lack an inventive step under PCT Article 33(3) as being obvious over Watanabe U.S. Patent 6,044,104 in view of Fattouche et al. U.S. 6,208,297 B1.

Regarding claims 13, 21 and 30, Watanabe does not teach a method includes a time of arrival (TOA) parameter as claimed in the pending application. In the abstract of Fattouche et al. invention, Fattouche et al. teaches methods and apparatus to estimate the position and velocity of a mobile receiver using parameters including the Time Of Arrival (TOA) of signals received by the mobile receiver. Watanabe and Fattouche et al. teachings are in the same field of endeavor. In the fourth embodiment of Watanabe teachings, a mobile speed detector 10 is provided to detect a relative value of the mobile speed by detecting the time variation speed of correlative values with respect to the output of demodulation correlator 4 and outputs it to search control section 8. In view of the fourth embodiment, it would have been obvious for one of ordinary skill in the art at the time the invention was made that the mobile station taught in Watanabe invention can be modified to calculate the TOA parameter as taught in Fattouche et al. invention for estimating the speed of the mobile station.

Regarding claims 15, 23 and 32, Watanabe does not teach a method includes an Ec/Io parameter as claimed in the pending application. In column 7 line 55 via column 8 line 35, Fattouche et al. teaches a cellular telephone measures the quality of received pilot signals by computing the ratio between the received energy of a pilot (Ec) to the total received power by the mobile (Io) in the description of an IS-95 cellular telephone receiving pilot signals. As also discussed in column 2, lines 50-65, although in IS-95 all sectors broadcast the same short code, the pilot transmitted by each sector is time-offset by an integral multiple of 64 chips from any other pilot signal. Watanabe and Fattouche et al. teachings are in the same field of endeavor. Because an IS-95 cellular telephone uses Ec/Io measurement of a pilot to estimate the suitability of the communications link between itself and the particular sector in a BS, therefore, it would have been obvious for one of ordinary skill in the art at the time the invention was made that the mobile station taught in Watanabe invention performs Ec/Io measurement of a pilot as discussed in Fattouche et al. invention. The motivation is Watanabe mobile station operates in IS-95 standard.

3. Claims 3, 11, 19, and 28 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest "the second integration time is shorter than the first".

4. Claims 14, 22 and 31 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest "the one or more parameter(s) include a root mean squared error (RMSE) for the TOA parameter".

---------- NEW CITATIONS ----------

US 6,044,104 A (WATANABE) 28 March 2000, see column 1, line 45 via column 2, line 10; column 3, line 39 via column 4, line 31; column 4, lines 7-17, lines 40-45.

US 6,208,297 B1 (FATTOUCHE et al) 27 March 2001, column 2, lines 50-65; column 7, line 55 via column 8, line 35.